Chapter 1
Smallholder Tree Growing in South and Southeast Asia

D.J. Snelder[1]* and R.D. Lasco[2]

Abstract This chapter sketches the context of this book. It addresses the questions why we focus on smallholder tree growing and why we discuss the Philippines as main case study country. Relevant background information related to the aforementioned questions is given, including a historical sketch on smallholder forest management and the development of concepts on smallholder tree growing in South and Southeast Asia, a review of farmers' motivations and other controlling factors affecting tree growing activities, and a discussion on the need for sustainable land use and, related to this, recognition of farmers' potential to produce wood and provide other forest benefits and ecological services. The chapter ends with an overview of the different sections under which the various chapters in this book have been arranged.

Keywords small-scale reforestation, tree plantation, tree management, forestry concepts

1.1 Introduction

The protection, planting, exploitation and management of forest and tree resources are activities that have a long history in most Asian cultures. Tree growing is part of traditional land use in both tropical dry and wet zones. In recent years, the role of smallholder communities in the management and protection of remaining forests is regaining importance in government policies and programs in Asia and elsewhere.

[1]Department of Environment and Development, Institute of Environmental Sciences, Leiden University, P.O. Box 9518, 2300 RA Leiden, The Netherlands

[2]World Agroforestry Centre (ICRAF-Philippines), Khush Hall, IRRI, College, 4031 Laguna, The Philippines

***Corresponding author:** snelder@cml.leidenuniv.nl

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This tendency is associated with the moral argument that conservation goals should contribute to, and not conflict with, basic human needs and, for that reason, local communities should be more involved in designing and implementing forest conservation policies. The use of such argument is, however, not new but has been emphasized in development issues for the last three decades, especially in the 1980s – by some even called the decade of participation (Chambers 1983; Ingham 1993), when the concept of sustainable development made a great shift towards 'people centered' development, community involvement, cooperative management, power sharing, decentralization and devolution, and empowerment. The role of smallholder communities is likewise increasingly recognized in the reforestation of agricultural lands in the form of growing trees on farms and also near settlements and built-up areas, i.e., the so-called "trees outside forests". The latter are a crucial resource in terms of meeting future needs, both public and private, for timber, woodfuel, other forest products and a variety of environmental services, particularly in developing countries (FAO 1985, 2006a). There is evidence of spontaneous forest product diversification through implementation of tree systems on farms by smallholders who lack easy access to nearby forest resources (e.g., in Cebu, Philippines; FAO 1993; in western Kenya, Scherr 1995). The trees relieve the pressure on remaining forest resources and restore and safe-guard ecological and socio-economic sustainability in agricultural landscapes. Moreover, smallholder tree growing is perceived as a potential strategy for poverty alleviation in various, often agroforestry and community forestry, programs world-wide (e.g., Cacho et al. 2003; ICRAF 2003; Sales et al. 2005; FAO 2005, 2006a). The extent to which tree growing can alleviate poverty and increase food security is however not well documented or clear to policy makers (FAO 2006a).

Yet, research on smallholder tree growing falls behind when compared to research into large-scale forestry and agricultural (tree) crop plantations. Not enough is known about the dynamics of trees on farmlands and their corresponding contribution to the production of wood and other products and services (FAO 2006a). In order to understand current and potential contributions of tree growing to rural development and forest services, extensive research and good statistical data are required. The latter are, however, absent from most official statistics (FAO 2006b). Likewise, data on the actual amount of land occupied by smallholder tree growing systems are still lacking partly because of the multitude of systems that do exist. Generally, no distinction is made for this category of land use by statistics agencies or in case there are distinctions, they are not uniformly perceived (Jensen 1995). Smallholder tree growing systems may be included in several of the categories usually applied in land use statistics such as: forest land, wood land, degraded land, agricultural lands, urban areas (homegardens) and "other land use" (e.g. road side plantings). In addition, the statistics should generally be treated with some caution although processes of data gathering and analysis have been improved since the use of satellite imagery.

In this introductory chapter, we will first give a historical perspective on tree growing, community participation and associated policies in Asia and elsewhere in the world, then sketch the context in which smallholder tree growing receives an

ever-increasing role in reforestation efforts, which in turn leads us to giving additional explanations for our focus on smallholder tree growing. We will then discuss smallholders' motivations and controlling factors for growing trees on their farms and land elsewhere. We proceed with a review of the rise and development of various concepts related to smallholder tree growing for those Asian countries that will be discussed in the separate chapters of this book. The chapter will be closed off with an overview of the remaining chapters in this book.

1.2 A Historical Sketch

Records on the oldest practices of tree growing mostly refer to the growing of trees near dwellings in order to provide products for subsistence and home consumption, i.e., the so-called homegardens. Soemarwoto (1987) suggests, based on Brownrigg's literature review of 1985, the earliest evidence of homegarden cultivation in the Near Eastern region dates back to 3000 B.C. and possibly 7000 B.C. Yet, in a recent publication Wiersum (2006) relates the origin of homegardening to 13,000 to 9,000 B.C., a period during which fishing communities were living in moist tropical regions.

Early evidences of use and management of forest resources in China also date back to a distant past. For example, oracle-bone inscriptions with graphs of agricultural words from the Shāng dynasty (ca. 1600–ca. 1046 B.C.) suggest trees in Shāng agriculture played a role comparable to that of trees in agroforestry systems today (Menzies 1996). Early scripts written during the Zhāu dynasty (1122–256 B.C.) refer to systems of forest manipulation and tree cultivation directed at the maintenance of forest productivity through, amongst others, carefully scheduled timber harvesting activities (Menzies 1996). At this time, and also later during the Han dynasty (206 B.C.–A.D. 220; Needham 1986), forest-related activities were predominantly controlled by the nobles, i.e., the farmland-owning classes. Much later in the early 20th century, when the first western scientists started to work in the severely degraded forest areas of northern China, Lowdermilk (1926 in Menzies 1996) discovered indigenous systems of silviculture in protected temple forests, in forests owned collectively by villages and temple associations and in densely populated suburban areas.

In the western world it was only in the Middle Ages that forestry practices were formally developed under the rule of the nobility, i.e., the highest social class, and implemented by farmers and laborers of lower social classes in the, at the time, prevailing feudal system (Shepherd et al. 1998). The more systematic forestry practices for timber purposes are believed to have begun in the 16th century in the German states (James 1996). In the eastern world, plantation forestry started in Japan during the Tokugawa period in the 17th century as a response to the increasing demand for wood and the deterioration of forest resources. It was initially mainly aimed at water conservation and erosion control, for example in the northern part of the main island Honshu (Totman 1985), and in the 18th century increasingly directed at timber production, practiced on both land of feudal lords and

common lands managed by farmers (Iwamoto 2002). In Europe, the increasing importance of timber in the 18th century led to the founding of forest science as a specialist discipline in Germany from where it spread to other European countries and their colonies in the 19th century (Shepherd et al. 1998; see also Appendix).

With the technological development in the 20th century, large-scale logging enterprises and monoculture, even-aged forest plantations emerged in rural areas worldwide (Shepherd et al. 1998). Moreover, after the disintegration of most colonial empires around the first half of the 20th century, the Food and Agriculture Organization (FAO) helped forestry departments of former colonies to transform earlier weakly centrally-controlled forests into important timber-producing areas and so-called "political forests", i.e., forests put under state forestry services and affected by both ecological and political processes (Van der Geest and Peluso 2006). Small-scale tree growing activities were still performed by rural communities but received relatively little attention from governments and (inter)national organizations throughout the 19th and most of the 20th centuries. During the second half of the 20th century, forestry laws and binding regulations in support of sustainable land use were being developed and enacted in response to growing environmental awareness. The latter was instigated by the rapid decrease in natural forest cover and associated biodiversity resulting from the excessive rise in timber exploitation rates. Moreover, there was much concern about the ever-increasing gap between demands for fuelwood and availability of supplies in developing countries where local resource-poor farmers used more and more crop residues and animal manure as a source of fuel rather than a source of mulch and fertilizer, affecting soil productivity (Arnold and Dewees 1997; Photo 1.1).

Photo 1.1 Smallholders collecting fuelwood in the uplands in Isabela Province, the Philippines (©DJ Snelder)

The integration of trees into farming systems in the form of agroforestry has been promoted since the late 1970s as a strategy for sustainable land use particularly in support of the rural poor (King 1987, Young 1997, FAO 2005) and, at its earlier stage, as a means to narrow the so-called fuelwood gap (FAO 1997). With the introduction of rural integrated development programs in the 1980s, smallholder tree growing regained recognition because of its potential role in mobilizing rural resources for the generation of a wide range of tree products, for both subsistence and commercial purposes, including timber, wood fuel, fruit, leafy vegetable, fodder, resin, oil, and medicine. In this context smallholder tree growing is also considered in recent times as a policy option addressing the Millennium Development Goals (MDGs; see http://www.un.org/millenniumgoals/). Smallholder tree growing is further linked to environmental services and the agenda on global change. Under the nomenclature agroforestry, it has been identified as one of the thematic areas by the Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) in 1996. The CBD refers to agroforestry as a form of adaptive management, being "a method of sustainable agriculture that employ management practices and technologies that promote positive and mitigate negative impacts of agriculture on biodiversity" (Decision V/5 2.3). Likewise, there is a clear link to agrobiodiversity being described as having "all components of biological diversity of relevance to food and agriculture and all components that constitute the agro-ecosystem, i.e., the variety and variability of animals, plants and micro-organism, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes" (Decision COP III/11 in 1996). More recently, the role of tree farming including agroforestry in mitigating climate change primarily through carbon sequestration has also been highlighted (IPCC, 2000, 2007).

1.3 From Deforestation to Reforestation: An Urgent Need for Sustainable Land Use

The state of forest resources in countries world-wide has reached a critical point; never before have forest ecosystems been so greatly and rapidly affected by human activities as during last decades. Large stretches of the world's forests, that have served in the subsistence and development of humankind, have been converted to other uses particularly agriculture or are severely degraded. The global net change in forest area approximated −8.9 million hectares per year in the period 1990–2000 (FAO 2001, with corrected data in FAO 2006b; Table 1.1). Deforestation still continues at a high rate today.

Most forest losses occur in tropical countries, particularly Africa, South America and Asia. The highest rate of forest reduction in South and Southeast Asia has been recorded for Indonesia with a loss of 1.9 million hectares (or 1.7 percent reduction) per year for the period 1990–2000 followed by Myanmar and the Philippines with losses of, respectively, 0.5 million hectares (−1.3 percent) and 0.3 million hectares

Table 1.1 Forest resources distribution and changes for the period 1990–2005 in South and Southeast Asia (FAO 2006a)

Country/ area	Land area	Forest area 2005				Forest area change 1990–2005			
		Natural forest	Forest plantation	Total forest		Total forest		Forest plantations	
						1990–2000	2000–2005	1990–2000	2000–2005
	000 ha	000 ha	000 ha	000 ha	% of land area	000 ha/ year	000 ha/ year	000 ha/ year	000 ha/ year
Bangladesh	13,017	592	279	871	6.7	n.s.	–2	3.7	0.6
Bhutan	4,700	3,193	2	3,195	68.0	11	11	0	0.2
Brunei	527	278	–	278	52.8	–2	–2	–	–
Cambodia	17,652	10,388	59	10,447	59.2	–140	–219	0.5	–2.6
East Timor	1,479	755	43	798	53.7	–11	–11	1.4	0
India	297,319	64,475	3,226	67,701	22.8	362	29	85.1	84.2
Indonesia	181,157	85,096	3,399	88,495	48.8	–1,872	–1,871	79.3	79.4
Lao PDR	23,080	15,918	224	16,142	69.9	–78	–78	9.5	25.0
Malaysia	32,855	19,317	1,573	20,890	63.6	–78	–140	–29.7	–17.2
Maldives	30	1	–	1	3.0	0	0	–	–
Myanmar	65,755	31,373	849	32,222	49.0	–466	–466	30.2	30.6
Nepal	14,300	3,583	53	3,636	25.4	–92	–53	0.3	0.2
Pakistan	77,088	1,584	318	1,902	2.5	–41	–43	6.2	4.4
Philippines	29,817	6,542	620	7,162	24.0	–262	–157	–92.8	–46.4
Singapore	61	2	0	2	3.4	0	0	0	0
Sri Lanka	6,463	1,738	195	1,933	29.9	–27	–30	–2.1	–5.1
Thailand	51,089	11,421	3,099	14 520	28.4	–115	–59	43.7	4.4
Viet Nam	32,550	10,236	2,695	12,931	39.7	236	241	108.3	129.0
S & SE Asia	848,952	266,492	16,634	283,127	33.4	–2,578	–2,851	239.9	286.7
Total World	13,063,900	3,801,848	150,177	3,952,025	30.3	–8,868	–7,317	–	2,800

(−2.8 percent) per year (Table 1.1). For the period 2000–2005, the rate of forest loss remained unchanged for Indonesia and Myanmar but decreased to −0.2 million hectares (−2.1 percent) per year for the Philippines.

Efforts to counteract these losses have been directed at the establishment of large-scale forest plantations. Plantation forests have in fact increased throughout the world, at an estimated rate of 2.8 million hectares per year during the period 2000–2005, and tempered – together with natural forest expansion – the annual rate of net forest loss from 8.9 to 7.3 million hectares (Table 1.1). Yet, forest plantations have not been equally successful in the region. For example, Asia (with a net forest loss in the 1990s), experienced a net gain in forest area over the period 2000–2005, but this was mainly as a result of large-scale afforestation reported by China (FAO 2006b). Moreover, forest plantations still comprise only a small percentage, i.e., 3.8 percent (or about 150 million hectares), of the total forest area world wide (FAO 2006b). It is unclear how much of this percentage is accomplished by smallholder

tree growers, if at all included in the country records on which this figure is based.

Remaining forest resources are unevenly distributed over different continents and countries world wide. In South and Southeast Asia, large-sized countries like Indonesia and India with, respectively, 88 and 68 million hectares of forest account for over half of the total forest area in the region (2005 records; Table 1.1). Yet, when looking at the distribution of percentage land surface covered by forest, Indonesia is grouped among countries with intermediate coverage (48.8 percent) whereas India has to be categorized under countries with relatively low coverage (22.8 percent). Lao Peoples' Democratic Republic and Malaysia have well over 50 percent of their land area under forest. Pakistan and Bangladesh hold only small patches of forests covering respectively 2.5 and 6.7 percent of the country's total land area. Vietnam, Thailand, Nepal, and the Philippines take an intermediate to low position with, respectively, 39.7, 28.4, 25.4 and 24.0 percent of forest coverage.

In addition to declining forest areas, suitable areas for the production of food for present and future generations are dwindling as well. Mainly marginal lands remain, the fertile lands traditionally being utilized for various forms of crop cultivation. Consequently, agricultural intensification is currently being practiced in many parts of the world in order to increase crop production and provide food security. However, agricultural intensification has not automatically led to sustainable forms of land use; on the contrary, it has been accompanied by serious forms of land degradation, particularly in the developing world where roughly one quarter of all farmland has been degraded (Garrity 2004). Farmland is affected by soil nutrient depletion and soil physical degradation due to repeated cultivation and harvesting practices without periodic application of fertilizers or manure. The much needed farm inputs, or fallowing time, for restoring the soil are lacking whereas the knowledge on alternative, cost-effective methods of sustainable land use is limited.

The urgency to stop, or at least control, the destruction of remaining forests and the degradation of agricultural land and look into a wide spectrum of solution-oriented measures of sustainable land use has nowadays been recognized as crucial to our survival. This recognition has triggered projects and programs on forest conservation, reforestation, and agroforestry worldwide aimed at the integration of trees in denuded and predominantly agricultural landscapes and funded by institutions like the World Bank, the Asian Development Bank, the European Commission (EU), and FAO.

1.4 Why Focus on Smallholders?

Since the 1980s, there have been clear signs of a paradigm shift in the forestry sector throughout Asia and elsewhere in the world: whereas large-scale timber-oriented industrial estates and reforestation projects dominated past forestry approaches, there is a trend towards small-scale and multiple use systems of tree growing and community forestry (see also Harrison et al. 2002). Environmental concerns and

various processes of rural development have facilitated this shift in the forestry sector as will be outlined below.

Firstly, the rate of success among large-scale reforestation projects has been less than expected as discussed earlier. In addition, environmental degradation and social problems associated with large-scale reforestation projects have raised much debate (Sawyer 1993; Carrere and Lohman 1996; Cannell 1999). For example, native longhouse communities in Sarawak resisted the establishment of a 200,000 ha *Acacia mangium* plantation in a former concession area partly claimed by about 20,000 mainly Iban people under Native Customary Rights (Barney 2004). The plantation, to be managed in intensive seven-year rotations, was initiated in 1996 as a joint venture between the Sarawak state government and the Singapore-based Asia Pulp and Paper. Key to the social conflict was the displacement of longhouses and the unconditional resettlement packages, raising also protest among various Sarawakian non-governmental organizations (NGOs). However, an exclusive emphasis on resistance to forest plantations, as practiced by some NGO networks, may undermine the fact that there is also widespread smallholder participation in plantation production; a tendency that is likely to increase in the future (Barney 2004). In addition, in-depth analysis of some of the previously adverse environmental assessments of tree plantations with species such as *Eucalyptus* proved to be unfounded (e.g., Sayer et al. 2004).

In addition to forestry plantations, smallholders have increasingly been involved in on-farm tree growing through the establishment of agroforestry systems. However from the start of its promotion in the 1970s, smallholder tree growing has received considerably less attention from the (less) developed and scientific worlds, when compared to large-scale tree planting and reforestation. More recently, with the expansion of small-scale cultivation in many regions of the world, the awareness is mounting that lands controlled by smallholders are of increasing importance in both sustainable food production and safeguarding environmental services, such as biodiversity conservation, watershed protection and carbon sequestration. They more and more determine the environmental, economical and ecological value of the landscape. Whether smallholder tree growing does indeed make a difference, and if so, to what extent it contributes to sustainable development and environmental protection and conservation, needs further investigation.

Another reason for increasing interest in smallholder tree growing is related to the expansion of areas under forest protection. The latter has lead to a ban on logging and restrictive use of natural forest products in countries like Indonesia, Thailand and the Philippines. Smallholders are therefore in search of alternative sources of tree products and ways of integrating trees into their farming systems through on-farm tree growing and forestry plantations. Moreover, it is expected that, with mounting population and land shortage, the number of farmers with smallholdings will remain high or may even increase in the near future.

Yet, the implementation of tree-based farming systems still faces controversy and need further exploration, given for example their contested role in providing profits to farmers under present conditions of increasingly competitive world markets. Whereas a small number of tree crops (e.g., coffee, cacao, tea) played a critical role in setting off economic growth during past three decades in Southeast Asia, at

present there is a need to broaden the array of tree products delivered to global markets by developing countries given the current overproduction and decreased profitability of the few traditional tree crop commodities (Garrity 2004). Moreover, smallholder tree production is still inadequately quantified hampering planning and policy development.

1.5 Smallholder Tree Growing: Motivations and Controlling Factors

Smallholder tree growing is often associated with multiple objectives and usages and differ with large-scale industrial tree plantations in terms of motives for tree species selection and protection, attitudes towards risk management and tree scarcity, and approaches towards tree establishment, management, and marketing (e.g., Scherr 1995; Dewees 1995; Arnold and Dewees 1999).

The main hypothesis of this book is that smallholder farmers will grow and integrate a range of tree species in their land-use systems as a means of risk aversion, livelihood diversification and response to restricted forest resources access, and will effectively react to increases in demands for wood, fruit and other tree food and fodder products, under conditions of secure land tenure and market access.

Yet, the rate of success of tree growing will depend on farmers' ability to overcome a number of barriers farmers face when undertaking tree growing activities. These barriers may be related, for example, to the availability of high-quality planting materials, the production of quality tree products for the market, the lack of tree production technologies, and the transport of farmer-grown indigenous tree products to markets due to policies intended to control illegal logging from natural forests.

In addition, tree growing is conducted under different environmental conditions and stages of land use intensification (e.g., Raintree and Warner 1986; Arnold and Dewees 1995; Van Noordwijk et al. 1997). Hence, a distinction can be made between tree growing in forest-rich and in forest-deprived areas (Fig. 1.1). In the former case, conditions of relatively low population density and locally abundant natural forests prevail. Tree management is practiced but primarily in a rather passive way. For example selective forest species may be logged and replaced with other valuable tree species, gradually converting natural forests into agroforests, village forests or jungle tea forests, as is evident from countries such as Lao PDR and Indonesia. In forest-deprived areas, population densities are usually rather high and natural forests have been cleared through logging and 'slash and burn'. Trees are established on farms and field boundaries through intercropping and line planting, like on *Imperata*-infested grasslands in the Philippines, Indonesia, India and elsewhere. Tree planting is practiced under intensive land use pressure and likely to be a more difficult undertaking compared to tree-growing in forest-rich areas i.e., testing more often than not farmers' patience and endurance. Eventually, it may lead to farmers deciding to move out of these areas particularly after experiencing a serious decline in crop yields due to ongoing degradation. (Noordwijk, Chapter 20,

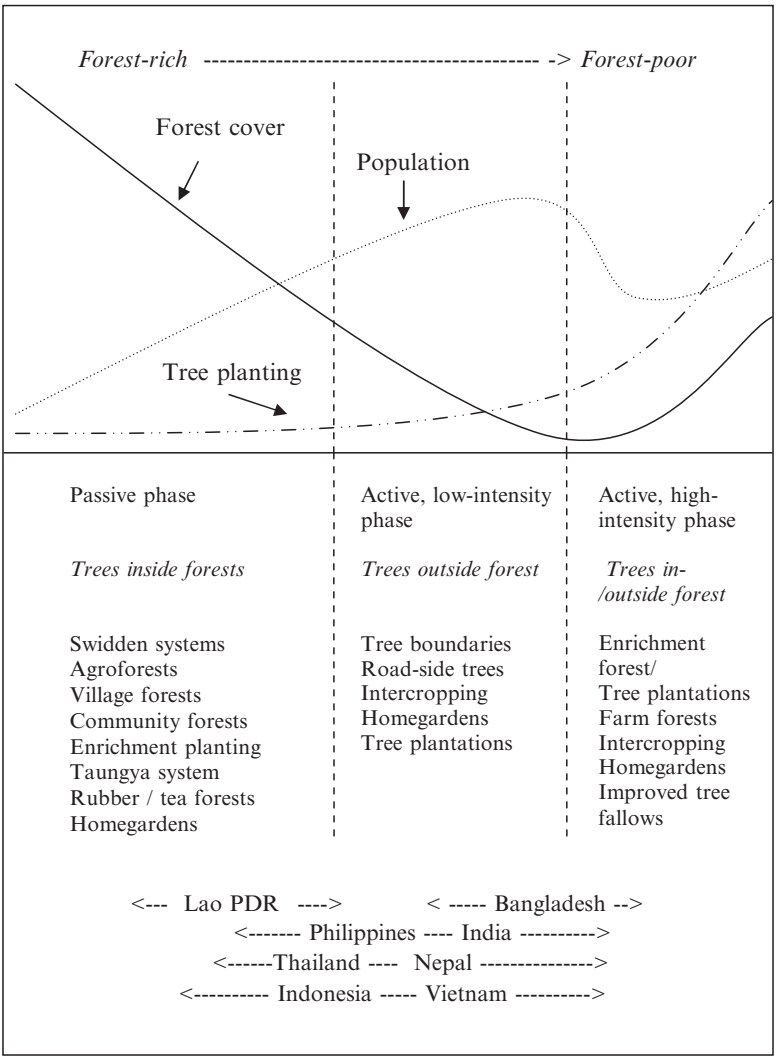

Fig. 1.1 Tree growing activities on (originally) forested land subject to changes in human population number, forest cover and corresponding phases of land use intensification in the countries discussed within the framework of this book, i.e., the Philippines, Indonesia, India, Bangladesh, Lao PDR, Nepal, Thailand, and Vietnam

this volume). The challenge in these areas is to move from an active phase of low-intensity tree growing towards a phase with trees planted at a wider, yet more intensive, scale in farms, blocks, watersheds and zones of forest regeneration, under conditions of increasing population pressure (Fig. 1.1). Farmers' decision making in growing trees on farms and grasslands highly depends on favorable conditions of land tenure security, community fire control, available technology, and marketing channels (Van Noordwijk et al. 1997).

1.6 Development of Concepts on Smallholder Tree Growing in South and Southeast Asia

There exists a variety of land use types with associated terminologies that can be classified under the nomenclature "smallholder tree growing" including small-scale forestry, community forestry, common-property forestry, social forestry, farm forestry and agroforestry. The meanings of these terms differ among countries and regions and can be, in some cases, even conflicting (Harrison et al. 2002), leading to different types of programs and systems of implementation. The first four terms generally refer to forests that are owned – or controlled – and managed by individuals or whole communities whose members share multiple benefits. The latter two terms refer to land use types composed of trees and other woody perennials grown in association with either seasonal crops or livestock, or both, in such a way that the overall system benefits from mutual economic and ecological interactions among the different components. Similarities and differences in concepts of smallholder tree growing, as maintained in various countries in South and Southeast Asia, are discussed in the Appendix. However in this book, the term smallholder tree growers refers to families who (1) have ownership, or at least control over, parcels of farm and forest land and in some cases share in the use of common property land totaling less than 1.0 ha up to a maximum of a few hundred hectares, and (2) grow trees on these lands including species that have been planted and/or those that have been protected after having established themselves spontaneously from (semi-)wild seedlings. Details on the development of concepts on smallholder tree growing for various Asian countries are given in the appendix.

1.7 The Philippines' Case Study

Within Southeast Asia, the Philippines stand out as a country that has lost most of its original tropical forests. Today, it is classified among those countries with lowest forest coverage in the region (Table 1.2). Whereas deforestation is still on-going, mostly illegally, the rates of forest loss before 1990 were highest throughout

Table 1.2 Classification of South and Southeast Asian countries into forest cover classes, based on data recorded in 2005 (FAO 2006a)

Classes of forest cover*		
75–50	50–25	25–0
Bhutan	Indonesia	Bangladesh
Brunei	Myanmar	India
Cambodia	Nepal	Maldives
East Timor	Sri Lanka	Pakistan
Lao PDR	Thailand	Philippines
Maleisia	Vietnam	Singapore

*: in percentage of country's land surface

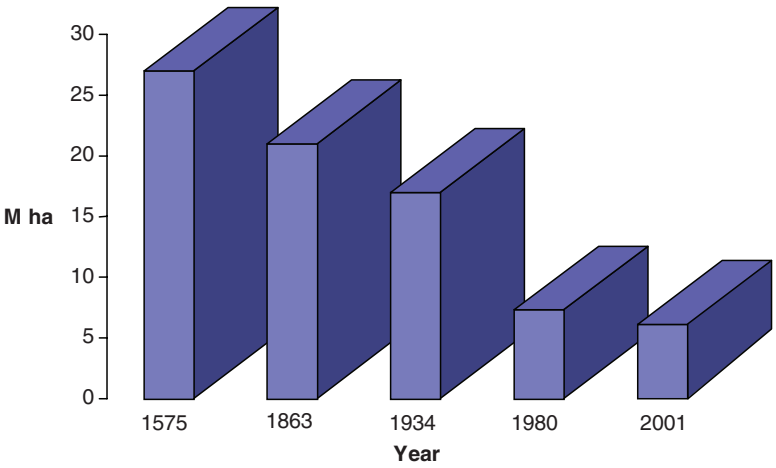

Fig. 1.2 The significant decrease in forest area (in million hectares) between 1575 and 2001 in the Philippines (Forest Management Bureau 2006)

Philippine history. Figure 1.2 shows the decrease in the Philippines forest area for the period before 1990. Remarkable is the period between the 1930s and 1980s when the forest area dropped from about 17 to 6 million hectares. The main cause of deforestation has been large-scale logging operations followed by other, partly associated, causes of forest loss and land degradation including upland migration, agricultural expansion, development policy failures, and inequitable land distribution (Photo 1.2). Although nowadays 15.9 million hectares of land is categorized as forest land based on the Philippines' land cover classification system, Fig. 1.3 shows that in 2005 only about 7 million hectares (or 24 percent) are indeed under forest cover, the remaining being open land, i.e., brushland, grassland or upland farms, and some plantations. The remaining forest cover is largely concentrated in the uplands on the islands of Palawan, Mindanao and Luzon.

An estimated 20 million people live and depend on forested uplands (CIFOR 2005) and face the high risks of severe soil erosion, rain-triggered landslides and flash floods causing hundreds of deaths and casualties on a regular basis. For example in December 2004, four consecutive typhoon and tropical storms caused floods and mudslides in deforested areas in Northeast Philippines leaving 1,060 people dead, 1,023 injured and 559 missing due to floods and mudslides (see: www.inquirer.net, Darmouth Flood Observatory at www.darmouth.edu). The events resulted in a wide public debate on what caused these floods and landslides and who was to blame for these disasters, pinpointing at either loggers or upland farmers in search for cultivable land (e.g., BBC News 2006, http://news.bbc.co.uk/2/hi/asia-pacific/4723770.stm). Then again in 2006, typhoons Bilis (July 2006), Xangsane (September 2006) and Durian (late November 2006) left respectively

Photo 1.2 Land use transition from forest to smallholder tree based and agriculture systems in the Philippines (©DJ Snelder)

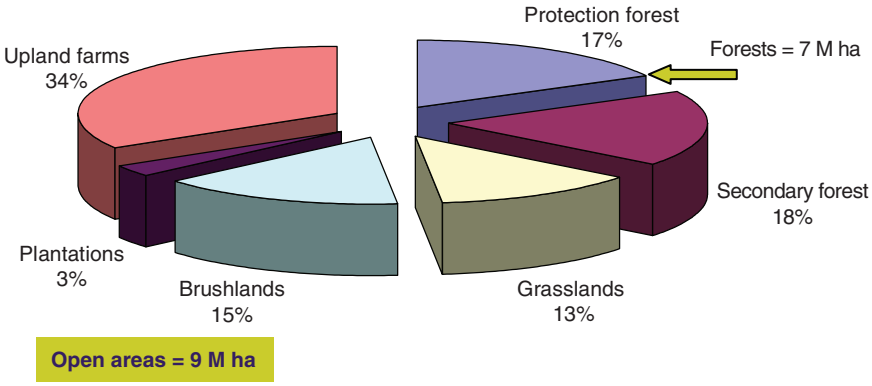

Fig. 1.3 The distribution of the different land use systems over land classified as "forest land" in the Philippines (Forest Management Bureau 2006; FAO 2006a)

626, 260 and 526 people dead. The high human toll and declining wood availability led to logging bans on primary forests and the establishment of protected areas in the 1990s, a reduction in concessions leaving a few sustainable operations, and massive reforestation efforts in the last few decades. After the disastrous storms in November–December 2004, President Gloria Macagapal Arroyo even announced a

cancellation of all logging permits and suspension of issuance of other permits (ABC 2004). Earlier efforts of reforestation were not only directed at large-scale forest plantations but, particularly since the 1980s, also at small-scale tree plantations and forest management. In fact, the Philippines are one of the leading countries in on-farm tree growing and decentralized programs of community-based forest management.

The past and ongoing tree growing and reforestation initiatives are summarized by CIFOR 2003 and described as follows:

> The first formal rehabilitation efforts in the Philippines can be traced back to reforestation by students of the campus of the University of Philippines at Los Banos in 1910. This was followed by numerous Government-initiated projects that involved the planting of trees to reforest denuded areas. By 1973, there were 91 government reforestation projects (46 in Luzon, 31 in Visayas and 14 in Mindanao) with reforestation funds derived from timber concessions. Some private companies (such as Paper Industries Corporation of the Philippines PICOP and Provident Tree Farms) reforested via tree plantations within their concession areas. PICOP also pioneered smallholder tree farms among upland farmers near the concession through partnerships.
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> The 1970s saw the birth of social/community forestry with programs such as Forest Occupancy Management (1971), the Family Approach to Reforestation (1971), Communal Tree Farm (1974), and the Integrated Social Forestry Programme (1982). From the late 1970s-80s, there were numerous community forestry initiatives funded by agencies such as USAID, the World Bank, Ford Foundation and GTZ. There was also major NGO pioneering work on agroforestry and agriculture. In 1986, a 14-year National Forestation Programme was launched with a target area of 1.4 M ha to be reforested by 2000. This programme was given a boost by the ADB/OECF loan for $240 M in 1988 for what became the Forestry Sector Project. Under this project, traditional methods of reforestation gave way to contract reforestation by families, communities, corporations, academic institutions, NGOs and LGUs. It also included watershed rehabilitation and encouragement of industrial reforestation through new agreements.
>
> The 1990s continued to see numerous community-based and integrated development projects funded by Asian Development Bank, Japan Bank for International Cooperation, World Bank, International Tropical Timber Organization, FAO, KFW (Kreditanstalt für Wiederaufbau) development bank and others; and executed by the state, NGOs, Local Government Units (LGUs), and People's Organisations (POs). Community based forest management through different types of tenurial instruments was adopted as the national strategy for reversing the destruction of the Philippines' remaining natural forests and for rehabilitating degraded lands. Besides social and community forestry, reforestation activities have also included large-scale government and industrial plantations and private tree farming. The latter has cropped up spontaneously in response to market demand, particularly in Mindanao, Luzon, and Cebu. It has been suggested that private land reforestation in the last decades may have actually led to increased forest cover in places. New forest cover inventories that are underway could help clarify the situation.

Table 1.3 gives an overview of the reforestation efforts under different forest management and tree growing programs using different types of tenurial instruments from 1980 onwards. Notwithstanding these massive efforts to control deforestation through the establishment of forest and tree plantations, they have had limited success even in more recent times. Remarkable high losses for forest plantations occurred, i.e., 92,800 ha (5.2 percent reduction) per year for the period 1990–2000 and 46,400 ha (5.4 percent) per year for 2000–2005 (FAO 2006b). Besides these records, Lasco et al. 2001 report a success rate of not more than 30 percent for a

Table 1.3 Temporal changes in the number of, and the area covered by, different types of forest and tree farm lease agreements in the Philippines (Forest Management Bureau Statistics Philippines 2006; http://forestry.denr.gov.ph/)

Year	Different types of forest and tree farm lease agreements											
	IFMA/ITPLA[a]		SIFMA[b]		Tree farm lease		Agroforestry farm lease		Community forest management agreements			
	No.	Area (ha)	No	Area (ha)	No.	Area (ha)	No.	Area (ha)	No of beneficiaries household	PO	Individual	Area (ha)
1980	12	88,000	–	–	101	9,000	2	1,000	–	–	–	–
1985	81	291,000	–	–	129	17,000	101	99,000	–	–	–	–
1990	81	304,000	–	–	101	13,000	94	110,000	–	–	8,858[c]	44,222[c]
1995	248	538,000	–	–	128	18,000	84	97,000	–	–	10,620	106,609
											18,296[c]	96,906[c]
2000	184	548,000	750	22,387	155	19,000	80	91,000	477,984[d]	–	–	5,482,393[d]
2003	198	702,000	1591	36,237	167	20,000	84	94,000	690,691[d]	2,977[d]	–	5,969,522

[a] Industrial Forest Management Agreement/Industrial Tree Plantation Lease Agreement to enabling private investors to engage in industrial forest management and plantation establishment. IFMA is to encourage logging companies to convert their business from pure timber-cutting into commercial timber plantations. To do this, the government announced that all Timber License Agreements (TLAs, logging permits), would expire in 16 years starting from 1991, while heavily promoting the IFMA as the alternative. Since the government hoped to promote IFMA as a large-scale reforestation programme, the usual area given to TLA holders (on average 10,000 ha) could be doubled, depending on the capacity of the prospective company (http://www.minorityrights.org/Dev/mrg_dev_title4_philippines/mrg_dev_title3_philippines_pf.htm accessed May 7, 2006).

[b] Socialized Industrial Forest Management Agreement enabling individuals, families, co-operatives or corporations to engage in plantation establishment ranging from 1 to 500 ha.

[c] Beneficiaries and total area covered by Community Forest Stewardship Management Agreements in which a portion of the public forest is allocated to a given community to manage, rehabilitate, reforest or develop for a period of 25 years renewable for another 25 years based on performance.

[d] Beneficiaries and total area covered by projects implemented within the framework of the Community-Based Forest Management Programme promoting active and productive partnership between the government and the forest communities in developing, rehabilitating and managing vast tracks of forest areas; communities are being organized and given long term (25 years, and renewable) tenurial instruments over forest areas with the privilege to derive direct benefits through harvesting of forest products, agroforestry and other livelihood programs. However, these privileges and benefits go hand in hand with the corresponding obligation to manage and protect the forest area in the long term. Moreover, benefits derived from production shares and livelihood opportunities are supposed to plow back and be equitably distributed to the POs, their members and families.

total of 1,300,000 ha of fast-growing trees planted between 1976 and 1995 in the Philippines, assuming success is defined as the proportion of area that evolves into secondary forests. Fast-growing tree species such as *Gmelina arborea*, *Eucalyptus* sp. and *Acacia mangium* were, and still are today, most commonly used and planted in the form of government and industrial plantations. As result of the disappointing accomplishments, the rate of reforestation has been lagging far behind the rate of forest loss. Whereas about 70,000 ha of land had been successfully reforested during the period 1916–1987, the average rate of deforestation was estimated at 100,000 ha per year (Forest Management Bureau 1988, Pasicolan 1996). No

improvement in forest coverage has been accomplished yet, with the Philippines being ranked at number six on the list of most forest-poor countries (based on the percentage land area under forest cover in 2005) in South and Southeast Asia (with 18 countries in total). However, most efforts directed at community-based forest management and on-farm tree growing are of relatively recent date (with a large area extension from 2000 onwards; Table 1.3) and, hence, the much awaited results still require some time for conclusions to be drawn.

1.7.1 Why the Philippines as a Case Study Country?

The discussion above partly reveals the special status of the Philippines within Southeast Asia in terms of environmental and socioeconomic and political developments. Whereas it is a democratic independent country these days, it has been influenced by foreign administrations being under the colonial rule of Spain, the United States and Japan (occupation of 1941–1945) for more than 400 years (1521–1946). Some of the earliest official tree growing and reforestation activities and research records date back to the American colonial period: the tree planting activities at the campus of the University of Philippines at Los Baños after the foundation of the Department of Agronomy and Forestry in 1910. The Philippines further stands out as a country within Southeast Asia which has lost most of its original tropical forests. However, at the same time, it has a long history in community tree growing or forestry programs and the formulation of policies and laws to create a legal regulatory regime conducive to the implementation of such programs. Compared to other Southeast Asian countries, the Philippine laws and policies in support of community forestry are among the most elaborate and enlightened (Cabarle and Lynch 1996). Yet the implementation lags, political will is limited or absent within many government institutions, and many laws, policies and programs are more than superficially contradictory. The implementation is further complicated by the regular occurrence of natural, or partly man-induced, disasters such as typhoons, earthquakes, floods, mudflows, and land slides. Within the context of such a challenging environment, the Philippines form an excellent case study country for the identification of potentials and constraints of smallholder tree growing.

In addition, the Philippines hold a special status with the main editors of this book. Both are affiliated with Philippine-based institutions for a longer period of time, enabling the accumulation of relevant information on the topic of this book, i.e., Rodel Lasco through his work at the World Agroforestry Centre (ICRAF Philippines Liaison Office) with its regional head office in Bogor, Indonesia and Denyse Snelder through her work with the Cagayan Valley Programme on Environment and Development (CVPED), a university partnership of Leiden University in the Netherlands and Isabela State University in the Philippines. ICRAF started its operations in the Philippines in 1993 in the College of Forestry and Natural Resource Administration building at the campus of the University of Philippines at Los Baños. CVPED started its university programme in 1989 at the

campus of the Isabela State University in Cabagan, Northeast Luzon. Both institutions have been building up scientific knowledge on tree and forest resources, with ICRAF conducting research at a wider scale (having offices and field sites throughout the Philippines) and CVPED running an education and research programme at a more local scale (with field sites centered around the office in Cabagan, Luzon).

1.8 Book Overview

This book is partly based on the outcome of an international seminar on tree growing in agricultural landscapes co-organized by CVPED-ICRAF and held in 2002 at the Cabagan Campus of Isabela State University, Philippines, to realistically assess and characterize the status of smallholder tree growing in countries like the Philippines. The seminar further addressed various aspects of smallholder tree growing some of which are integrated within the framework of this book. Questions were formulated such as to what extent have trees been integrated into smallholder farming systems and what evidence do we have that such systems lead to sustainability and enhanced livelihoods? Where is the concept exceptionally promising, and where can it be admitted as a failure? How can we ensure successful implementation of different tree-based farming technologies in terms of adoption, impact on livelihoods and environmental impacts? In short, is smallholder tree growing a viable strategy for sustainable development in rural areas?

The book looks into various questions and aspects of smallholder tree growing that are discussed below including smallholder tree growing and its role in sustainable rural development, its potential for marketing of wood products and contribution to environmental services, and its promotion through employment of various instruments of sustainable management and conservation.

1.8.1 Smallholder Tree Growing for Sustainable Rural Development

Agricultural development and intensification have presented countries throughout South and Southeast Asia with substantial environmental problems over the past decades. Farmers experience a decrease in soil fertility and are forced to apply growing quantities of chemical fertilizers, pesticides and herbicides in order to sustain their cash crop yields, which in turn often result into mounting debts aggravating their poverty status. With increasing awareness of farmers' struggle to maintain adequate yields and escape poverty, initiatives have been undertaken by research institutions, universities, and non-governmental organizations to investigate and promote sustainable land use technologies and livelihood systems. Smallholder tree growing is considered as one of the most promising technologies. Yet, it is still unclear whether tree growing has been practiced in such a way that all aspects

of sustainability have been met. If the answer is negative, what can be done to improve sustainability? What is farmers' perception about (newly introduced) tree-based farming systems and to what extent, and under which conditions, have they indeed adopted such systems? What methods of scaling up of smallholder tree growing have been successful and what knowledge and communication gaps do still exist? Tree based farming systems vary in management and productivity, and it is often questioned how these systems compare to other types of land use in terms of profitability. Smallholder bio-crop production and rural processing may be implemented as a way to raise the value of tree products. In this context, sustainable forestry certification will be discussed.

1.8.2 Smallholder Tree Growing for the Market

One of the challenges faced by smallholder tree farmers is marketing their products. There have been anecdotal stories in the past where farmers were lured to plant trees by the prospect of becoming rich upon harvest only to find out later that wood prices are way below their expectations. A case in point is the Philippines where one would expect a healthy market for wood products considering that log importation amounted to US$686 million in 2004 (Forest Management Bureau 2006). However, a recent case study revealed that tree growers in the country are finding it hard to market their products (Calderon and Nawir, 2006). Among the reasons for these are unstable policy environment, policy conflict, lack of marketing plan, poor and unstable markets for tree species, inadequate marketing support from government agencies, and high transport costs (Chokkalingam et al. 2006). An example of unstable policy environment was when the Department of Environment and Natural Resources suddenly suspended in 2004 cutting permits from all community based forestry projects. This was subsequently lifted but such flip flopping policy discourages farmers from planting trees.

1.8.3 Smallholder Tree Growing for Environmental Services

The on-going disappearance of large stretches of forests threatens biodiversity and the natural environment in general throughout South and Southeast Asia. In order to conserve remaining forest, protected areas have been established worldwide. Yet, in recent years, the growing of trees in agricultural areas has become an additional focal point for safeguarding the environment and its services. However, various questions remain to be answered. To what extent do smallholder tree based farming systems indeed contribute to environmental services like biodiversity conservation and watershed protection? What are the most optimal systems, and to what extent do these systems meet the needs of both smallholders and society in general? How can we reward smallholder tree growers contributing to environmental conservation and sustainability that serve society as a whole?

1.8.4 Instruments Facilitating Sustainable Smallholder Tree Growing

Concerns about the fragile relationship between forest use and natural functioning forest ecosystems have led to the establishment of the Forest Stewardship Council (FSC) in 1993. The FSC developed a set of global principles and criteria for environmentally and socially responsible forest practices to be audited for compliance by third parties and certify those operations with a positive audit result (Cashore et al. 2006). The question is, however, to what extent such standard for forest certification is applicable to smallholder tree growing operations. Reports are made of smallholders facing various constraints in their effort to achieve forest certification (Higman and Nussbaum 2002). Moreover, it is questionable whether forest certification will facilitate their excess to markets for wood products. A more recent initiative launched by FSC in 2002 to increase access to certification for Small and Low Intensity Managed Forests (SLMF; FSC 2002) may offer a more relevant instrument within this context. The initiative is directed at woodlot owners, farmers growing trees on farms, family forests, small non-industrial private forests (NIPF), small forest enterprises (SFE), some community forestry operations and non-timber forest product harvesters.

Acknowledgements The book is based on the international seminar on tree growing in agricultural landscapes, April 11–14, 2005, hosted by Isabela State University Cabagan Campus and co-organized by the Cagayan Valley Programme on Environment and Development, a joint undertaking of Leiden University (CML) and Isabela State University (ISU), and the World Agroforestry Center of the Philippines (ICRAF-Philippines). The seminar took place within the frame work of the Junior Expert Programme funded by the Ministry of Foreign Affairs in the Netherlands. The latter programme formed an extension of the Cagayan Valley Programme on Environment and Development and concentrated on two specific fields of research, i.e., agroforestry and indigenous people.

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Appendix: Development of Concepts on Smallholder Tree Growing in Various Countries in South and Southeast Asia

India

People in *India* have been practicing tree growing spontaneously for thousands of years (Puri and Nair 2004), both on farms and around houses for subsistence and, later on, also marketing purposes. Trees played a special role in their daily lives, as they still do today, with various species being valued as sacred trees. At a national level, the management of tree and forest resources was primarily aimed at the production of commercial products such as teak. As early as in 1805, the British government requested the British East India Company to investigate the availability of teak in Madras to meet the needs of British shipbuilding during the Napoleonic war (Barton 2000). Environmental concerns about deforestation (Weil 2006) and a critical timber shortage already by the 1840s (Barton 2000) promoted the establishment of a Forest Department in 1855 by the governor general of India, i.e., Lord Dalhousie. Large areas with forests, the latter being property of the British government in India, were now declared protected areas (Barton 2000). Some considered the annexation of areas for state forest conservation as a way of concealing the real considerations of the British government, i.e., the need for raw materials and the justification of forest expropriation from "traditional" forest users in order to more fully exploit forests resources (Weil 2006). The Indian Forest Act of 1878 subsequently gave the state greater control over forest management.

Nowadays, teak is mainly planted outside forests and still plays a significant role as timber producer (Pandey and Brown 2000). Likewise, there are many other trees outside forests that are crucial in generating fruits and vegetable products but foremost they are important as a main source of fuelwood. In Kerala for example, the most densely populated state of India, trees outside forests account for about 90 percent of the state's

fuelwood requirements. Of the 14.6 million cubic meters of timber produced per year, an estimated 83 percent was derived from homesteads (house compounds and farmlands), 10 percent from estates and only about 7 percent from forest areas (FAO 2001). There are a diversity of agroforestry systems directed at smallholder tree growing including trees in farms and on farm boundaries, trees grown in close association with village rainwater collection ponds, crop-fallow rotations, silvopastoral systems, trees within settlements, agroforests, community forests and a variety of local forest management and ethnoforestry practices (Pandey 2007). The promotion of tree growing through agro- and community forestry systems emerged because of concerns over ongoing forest degradation in the 1970s. In 1976, the National Commission on Agriculture (NCA) recommended the creation of 'social forests' on common lands and state forests to provide the local communities fuelwood, small timber and fodder, yet without specifically emphasizing the role of local people (Sekhar and Jørgensen 2003). With projects spread all over the country, the planting of trees for commercial or subsistence purposes was promoted in and around privately owned farms (farm forestry), in combination with agricultural crops on cultivated fields (agroforestry), in the form of woodlots on village common lands or community lands (community forestry), as block plantations on government wastelands and degraded forestlands, and along road sides, canals and railroads (extension forestry). The tree plantations covered areas of 0.1 ha or more in the case of block plantations, less than 0.1 ha in the case of farm forestry, or consisted of lines of individual trees along, for example, road sides (Harrison et al. 2002). However, disappointing results of the social forestry projects and the ongoing deforestation made the Indian government change its forestry policy towards a more people-oriented approach of Joint Forest Management (JFM), i.e., a state-community partnerships in forest management. The Indian National Forest Policy of 1988 (MoEF 1988) together with a government resolution on participatory forest management (MoEF 1990) entrust local communities with legal access to forest resources, encourage communities to set up village forest management committees and ensure a share of the produce from the forest resources (Yadama et al. 1997).

Thailand

Examples of traditional tree growing activities in *Thailand* are the forest gardens on the Kao Luang slopes in southern Thailand and the miang gardens (Werner 1996) or jungle tea agroforests (Thomas et al. 2007) in northern Thailand. The latter refer to tea trees that grow naturally in hill evergreen forests, with *Camellia sinensis L.* being planted and managed as an understory tree and used by villagers to produce green tea or miang. Moreover, various ethnic minority groups have been living as farmers in upland forest for a long period of time, as described by Kunstadter et al. (1978), making use of different types of swidden systems including opium-based systems (Thomas et al. 2007). Traditionally, the management and use of Thai forests has been controlled by relatively autonomous local nobilities, many of whom gained profits from logging contracts with

European companies, until the end of the 19th century. In 1896, the Royal Forest Department was established and tasked with the institution of central authority over regional nobilities (Pragtong and Thomas 1990 in Lakanavichian 2001). The department was further charged with the regulation and control of forest logging, initially operating under absolute monarchy, and from 1932 onwards, under constitutional monarchy. In 1989, a total ban on commercial timber harvesting was declared to stop the rapid deforestation, and major changes in Thai forest policy started (Salam et al. 2006). In 1990, a Community Forest Act was drafted followed by the enactment of a Forest Plantation Act in 1992. Although intentions were there to involve communities in forest plantation and management, the Royal Thai Government rather believed in large-scale private plantations as a way of mitigating deforestation, reviving the forestry sector and supplying wood for domestic consumption (TFSMP5 1993 in Lakanavichian 2001). However, due to the increasing resentment among local communities and NGO's, the promotion of commercial large-scale monocultures of fast-growing trees was halted in 1992. Efforts were subsequently directed at the promotion of small-scale tree farms. Thomas et al. (2007) refer to three main strategies that have been used to promote tree growing in midland and highland areas, i.e., simple agroforestry primarily centered on the planting of fruit trees (temperate fruits like pears, plums, litchee, and Chinese apricots and subtropical fruits like mango and longan) on agricultural fields (e.g., Withrow-Robinson et al. 1998), complex agroforestry in the form of extension or improvement of the jungle tea plantations in the hill evergreen forest (with integration of fruit trees in some areas) and the community-managed forest directed at the maintenance and expansion of permanent forest protected and managed by local communities. However, the results of these efforts are still limited. Farmers face multiple constraints when establishing tree plantations, including no or few incentives, long waiting periods prior to tree sales, lack of legal support for community forest management, lack of legalization for tree felling and selling, lack of specific tree growing technologies and absence of government support, through the Royal Forest Department, in developing marketing channels for small farmers in plantation and wood-product business (Lakanavichian 2001; Salam et al. 2006). Community Forest Management has been debated for quite some time with a number of alternative drafts of proposed community forest legislation prepared separately by the Royal Forest Department (RFD), i.e., the 'ministry version', and the alliance of academics and NGOs, commonly referred to as the 'people's version', since the 1990s (Salam et al. 2006). It is only recently (on the 21st of November 2007) that the Community Forest Bill was passed in the National Legislative Assembly (see Hares, Chapter 19, this volume).

Bangladesh

The forests of *Bangladesh* have been under planned management for over a hundred years, with the first forests being notified as reserved forests after the Forest Act VII of 1865. The Forest Act of 1927 grants the government several basic powers, largely for

conservation and protection of government forests, and limited powers for private forests (FAO 2000). After independence in 1971, teak was identified as the main species for plantation and "taungya" agroforestry system (the latter system is comparable to the Indonesian system discussed below). In 1989, the 1927 version of the forest act was amended for extending authority over "any [Government-owned] land suitable for afforestation" (FAO 2000). Bangladesh has further a long tradition of tree growing in homesteads and homegardens like elsewhere in Southeast Asia (e.g., Ahmed et al. 2003). Likewise tree growing in the form of traditional forestry has been practiced in the form of village forests, tea and rubber gardens and shifting cultivation systems in hill forest (Islam 1998). Whereas in present times homegardens cover only about 2.3 percent of the land (1995 data; Jensen 1995), village forests play a more important role supplying 80 to 82 percent of the forest products in villages (Douglas 1981 cited in Forestry Master Plan 1992). It is estimated that these forests cover about 270,000 ha (Forestry Master Plan 1992) containing, amongst others, bamboo, palms, and trees (for fruit, fuelwood, construction, shade, and other multiple purposes). Nevertheless increasing population densities, logging and land use conversion- with shifting cultivation (Islam 1998) and poor people's dependence on natural resources (FAO 2000) being identified as the main cause of deforestation-resulted in a substantial decline in the country's total forest cover. Decades of traditional forest management, based on forest policy guidelines of 1894, 1955 and 1962, proved to be ineffective causing a drastic net loss in forest resource cover (Muhammed et al. 2005). This trend started to change with the introduction of social forestry as a strategy of poverty alleviation and socio-economic development in the early 1980s. In 1994, Bangladesh adopted a new National Forest Policy with emphasis on people-oriented programs to conserve natural resources, preserve existing values and to maximize benefits to local people (FAO 2000). Based on a field survey in 2003, Muhammed et al. (2005) report that thousands of poor farmers have benefited from forest expansion since the mid-1980s through different social forestry plantations including woodlots or block plantations (30,666 ha), agroforestry (7,738 ha), strip plantation (48,420 km), and village afforestation (7,421 ha). Yet, at the same time, they refer to various shortcomings in the social forestry programme making its participants skeptical and, hence, preventing full exploitation of the social forestry benefits. Moreover the area under tree cover further declined from about 14.9 percent under public forest and another 1.8 percent under village forests in 1996 (FAO 2000) to a total of 6.7 percent forest cover in 2005 (FAO 2006b, Table 1).

Indonesia

In *Indonesia*, small-scale tree growing has traditionally been practiced spontaneously by most households throughout the archipelago in the form of village forests (hutan rakyat), village forest gardens (talun) or homegardens (talun-kebun, pekarangan). Yet, forest management and tree growing have also been introduced intentionally particularly in areas where forest resources have been affected by mounting population pressure like on the island of Java. For example, Java's teak (*Tectona grandis*)

management system was designed in 1847 and resulted in 1890 in the first forest district management plan, which was based on the principle of sustained yield (Simon 1989). A regeneration taungya system (*tumpangsari*) for teak forests was adopted in 1873, in which all teak-growing activities were performed by farmers living near the teak sites. The farmers had the right to grow agricultural crops between rows of teak and *Leucaena* for a specified period, although the main reason for granting farmers such benefits was to minimize the operational costs of the teak plantations. Intensified taungya systems are still widely practiced as regeneration systems of teak and other species plantations (e.g., *Pinus merkusii*, *Swietenia macreophylla*; see also Kartasubrata and Wiersum 1995), being considered as a form of social forestry since the 1980s. In 1985, the State Forest Corporation Perum Perhutani started the implementation of 13 social forestry projects on Java's public lands with farmers being allowed to plant fruit trees and horticultural crops in between requested timber trees (Kusumanto and Sirait 2000). Similar projects on islands other than Java (e.g., South Kalimantan, South Sulawesi, and West Irian) were initiated at a later stage in 1992. In 1995, the Indonesian government announced a new policy and "community forest" program by issuing the Ministry of Forestry Decree No. 622/Kpts-II/1995, which was revised in 1998 yielding Decree No. 677/Kpts-II/1998 (Inoue 2007). With these decrees, communities – or cooperative groups of people – living within and near the forest can be given the right to use the forest in what is known as Hak Pengelolaan Hutan Kemasyarakatan (HPHKM) or a License to Manage the Forest (Hindra 2005). The license is acknowledged by the government as a Utilization Permit (previously by means of Community Forestry Concession Rights) for timber and non-timber forest products valid for a period of 35 years (Kusumanto and Sirait 2000). Since October 1999, the permits have been granted in the form of Community Forestry Temporary Permits valid for just 5 years but with possible extension. The authority of local administrative units in forestry and tree growing affairs has been extended since the start of the decentralization process in 2001. Moreover, with the issue of Decree No.31/Kpts-II/2001 in 2001, local people have been recognized as the main actors in forest management. However, the decree was counteracted by new regulations on forestry planning in 2002. In 2004, the regulation of the Ministry of Forestry No. 1/Menhut-II/2004 was issued, facilitating the implementation of the Social Forestry Programme launched by the newly appointed minister in 2003. The regulation entails the empowerment of people living within and surrounding the forest through the practice of social forestry (Hindra 2005). By the end of 2004 the Ministry of Forestry declared five priority policies, one of which addressing the empowerment of the economy of communities within and surrounding the forest. Finally a Private Forest Programme (Program Hutan Rakyat) also exists in Indonesia, granting credits to farmers in order to support the development or rehabilitation of privately owned forest lands (Kusumanto and Sirait 2000). These *private* lands are planted with timber species or non-timber species such as fruits and coffee. In various parts of Indonesia, there are various examples of well-managed private plantations that developed spontaneously in response to market demands of various forest-related products (Michon and De Foresta 1997).

Lao PDR

In *Lao PDR*, tree growing is traditionally being practiced in rice-based swidden systems in upland areas home to multiple ethnic minority groups and in homegarden systems (with a variety of fruit and vegetable trees) typically of a more rudimentary form in areas still rich in forest resources and a more developed form in areas where forest resources are (becoming) scarce (Bounthong et al. 2006). In addition to these most common practices, other traditional systems exist including hedges of woody species around agricultural fields (living fences), multistory tree gardens, orchards and plantations, taungya for forest regeneration along river banks in the North and in upland areas, and economically improved fallows (e.g., integration of mulberry or *Broussonetia papyrifera*, cardamom or *Amomum* spp. and benzoin or *Styrax benzoides*; Hansen and Sodarak 1996). Efforts by the Lao government to stop or at least stabilize shifting cultivation have been directed at improvement of swidden systems or facilitation of alternative systems such alley cropping and contour hedgerows using woody species (Hansen and Sodarak 1996). Likewise efforts have been made to implement sustainable forest management on sloping land and in state-owned production forests since the early 1990s. One such initiative was the Lao-Swedish Forestry Programme (LSFP) in 1992–2000 under which villagers participated in production forest management, referred to as Joint Forest Management, in an area of 9,500 ha in the Savannakhet Province (Phanthanousy and Sayakoummane 2005). Natural forests and forestlands all belong to the national community represented by the State in the management and allocation of these resources for rational use by individuals and organizations as stipulated by in the Forestry Law 125 of 11 October 1996. Another initiative concerned the launching of a Forest Management and Conservation Programme (FOMACOP), a national programme implemented by the Department of Forestry of the Ministry of Agriculture and Forestry in 1993, with a Forest Management Sub-Programme (FMSP) focusing on "village forestry" (Fujita et al. 2005). The programme started its field activities in two central provinces of Laos, with local communities leading the management of production forests of 260,000 ha in total through so-called Village Forest Associations in partnership with district and provincial foresters. Under the FMSP, villagers gradually organized themselves and collectively designed and implemented sustainable forest management plans and associated rules. FOMACOP terminated in 2001 and was followed by a project on Sustainable Forestry for Rural Development Project (SUFORD). The latter, covering four provinces but eventually aiming at nation-wide coverage, elaborated on two key aspects of the previous programme, i.e., participatory forest management and training and capacity building. The project further included more components, such as sectorwise policy reform, whereas village development became an integral part of project design and implementation. The concepts of village forestry and community-based management of production forests are also integrated in the government's *Forestry Strategy to the Year 2020 of the Lao PDR* (MAF 2005). The government issued a PM Decree No. 59/2002 on sustainabale management of production in May 2002 (Phanthanousy and Sayakoummane 2005). The Ministry of Agriculture and

Forestry (MAF) subsequently issued regulation No. 0204/MAF.2003 to effectively implement the above Decree by sustainable management and use of forests, non-timber forest products and forestlands within production forest areas with participation of local authorities and villagers (Phanthanousy and Sayakoummane 2005). Village participation is organized through (Groups of) Village Forestry Organizations ((G)VFO) under a Village Forest Management Agreement signed between the (G)VFO and the respective district's Forestry Management Unit. The agreement specifies the rights and responsibilities of all parties, the scope of village participation, and the revenue sharing arrangement. Other MAF regulations give details on legal prescriptions for logging and harvesting of forest products, including cutting limits for natural trees.

Vietnam

In *Vietnam*, tree growing in the form of agroforestry have existed for a long time and shows similarities with systems of tree growing in Laos discussed above. Typical are the traditional swidden or shifting cultivation systems implemented by ethnic minority groups in the uplands and the homegarden systems in rural areas throughout the country. Research into agroforestry systems has, however, only been initiated in the early 1970s, leading to adaptation of some traditional agroforestry systems (particularly innovated shifting cultivation and swidden systems) and introduction of new systems (e.g., alley cropping, boundary planting and taungya). CARES (2004) refers to different types of traditional agroforestry systems, including intensive perennial (particularly multi-purpose) tree gardens of 0.5 to several hectares, more extensive (planted, high-value fruit/timber) forest gardens of 0.3–0.5 ha per household, three to four-storied fruit gardens close to settlement areas, homegardens, (fruit/timber)garden-fishpond-livestock systems covering about 500–1,000 m^2 per household on average, and related to the latter, the forest-garden-fishpond-livestock systems. In addition, tree growing is practiced within a number of forest-based systems such as (predominantly natural) forest-terrace systems, composite swidden systems, (natural/planted) forest-cash crops-rice systems and the taungya systems to recover natural forests. Traditionally, Vietnamese forests have been managed by upland communities over centuries but the recognition and implementation of the concept community forestry only started to develop in the 1970s (Nguyen et al. 2005). A legal basis for both subsistence and commercial community forestry was achieved again much later with the Land Law (revised) in 2003 and the Forest Protection and Development Law in 2004 (Nguyen et al. 2005). The former specifies the village community as the party to which the State allocates land or whose agricultural land use right is recognized by the State whereas the latter stipulates forest allocation to village communities including their rights and duties. The Civil Law (revised) in 2005 acknowledges the concept of common ownership by the community, based on either traditional customs or a benefit sharing agreement on joint management and utilization of the forest by community members.

The Philippines

The *Philippines* stand out as one of the countries having lost most of its original natural forests but at the same time being one of the first countries that started the decentralization process transferring responsibilities of forestry policies and programs from national to local level, and one of the leading countries in community-based forest management and smallholder tree plantations. These specified conditions, and their associated lessons to be learned, are some of the reasons why the Philippines are selected as a case study country in the first part of this book. More details on Philippine concepts and programs relating to smallholder tree growing have been discussed earlier in this chapter.